

CLAIMS

1. A fluorescence measuring apparatus, comprising:

a pumping light source outputting pumping light;

a pipette having a first internal space;

5 a tip having a second internal space, said tip having a suction inlet, provided at a front end thereof, for suctioning in a sample that emits fluorescence with a predetermined wavelength as a result of irradiation of the pumping light;

10 a pipette adapter arranged between said pipette and said tip, and having a third internal space which communicates the first internal space of said pipette and the second internal space of said tip, said pipette having a pumping light introducing structure for guiding the pumping light, emitted into the third internal space from said pumping light source, to said suction inlet of said tip; and

15 a fluorescence detection system for detecting the fluorescence emitted from the sample that has been suctioned in via said suction inlet of said tip.

20 2. A fluorescence measuring apparatus according to claim 1, further comprising a first optical system, arranged between said tip and said fluorescence detection system, for guiding the fluorescence emitted from the sample to said fluorescence detection system.

25 3. A fluorescence measuring apparatus according to claim 1, wherein said pumping light introducing structure includes:

25 a pumping light introducing window for introducing the pumping light from the exterior of said pipette adapter into the third internal space; and

a mirror reflector for reflecting the pumping light, introduced into the third internal space via said pumping light introducing window, towards said suction inlet of said tip.

4. A fluorescence measuring apparatus according to claim 1,
5 wherein said pumping light introducing structure includes an optical fiber through which the pumping light propagates, said optical fiber having a front end portion inserted from the exterior of said pipette adapter into the third internal space and emitting the pumping light from one end thereof positioned in the internal space toward said suction inlet
10 of said tip.

5. A fluorescence measuring apparatus according to claim 4,
further comprising a second optical system arranged between the one
end of said optical fiber and said suction inlet of said tip, said second
optical system condensing the pumping light emitted from the one end
15 of said optical fiber.

6. A fluorescence measuring apparatus according to claim 1,
wherein said pumping light introducing structure includes a first optical filter for selectively irradiating just wavelength components with a predetermined wavelength band, among the pumping light introduced
20 from the exterior of said pipette adapter into the third internal space,
toward said suction inlet of said tip.

7. A fluorescence measuring apparatus according to claim 1,
wherein said fluorescence detection system includes:

25 a fluorescence separating section for selectively separating the fluorescence from among the light arriving from the sample; and
a photodetector for detecting the fluorescence separated by said

fluorescence separating section.

8. A fluorescence measuring apparatus according to claim 7, wherein said fluorescence separating section includes a second optical filter arranged outside said tip and on an optical axis of the pumping light which is directed from said pumping light source toward said suction inlet of said tip via said pumping light introducing structure, said second filter selectively transmitting the fluorescence emitted from the sample, and

wherein said photodetector detects the fluorescence transmitted through said second optical filter.

9. A fluorescence measuring apparatus according to claim 8, further comprising a structure withdrawing said second optical filter, arranged on the optical axis of the pumping light, to a position deviated from the optical axis of the pumping light.

10. A fluorescence measuring apparatus according to claim 7, wherein said fluorescence separating section includes a dichroic mirror for transmitting one of the pumping light and the fluorescence emitted from the sample and reflecting the other of the pumping light and the fluorescence.

11. A fluorescence measuring apparatus according to claim 10, wherein said fluorescence separating section includes a dichroic mirror, arranged between said pumping light source and said pumping light introducing structure, transmitting the pumping light while reflecting the fluorescence emitted from the sample, and

wherein said photodetector detects the fluorescence reflected by said dichroic mirror.

12. A fluorescence measuring apparatus according to claim 7,
wherein said fluorescence separating section includes a third optical
filter, arranged at a position which is outside said tip and which is
deviated from the optical axis of the pumping light, directed from said
pumping light source toward said suction inlet of said tip via said
pumping light introducing structure, for selectively transmitting the
fluorescence emitted from the sample, and

5 wherein said photodetector detects the fluorescence transmitted
through said third optical filter.

10 13. A fluorescence measuring apparatus according to claim 8,
wherein said fluorescence detection system further includes a
collimating optical system, arranged between said tip and said second
optical filter, for collimating at least a part of the fluorescence emitted
from the sample.

15 14. A fluorescence measuring apparatus according to claim 12,
wherein said fluorescence detection system further includes a
collimating optical system, arranged between said tip and said third
optical filter, for collimating at least a part of the fluorescence emitted
from the sample.

20 15. A fluorescence measuring apparatus according to claim 1,
wherein said pipette adapter further comprises a positioning structure
for defining an attachment position of said tip.

25 16. A fluorescence measuring apparatus according to claim 1,
wherein said tip further comprises a positioning structure for defining an
attachment position of said tip itself.